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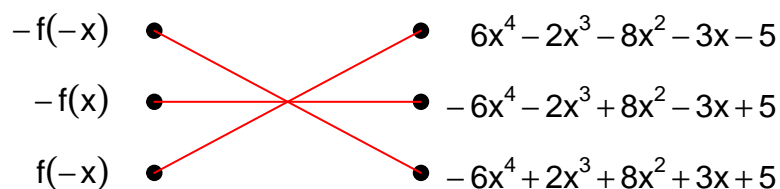
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Exam: Function Reflections (Solution version 42)

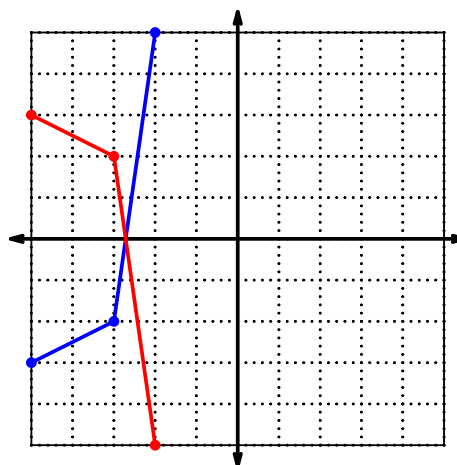
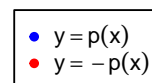
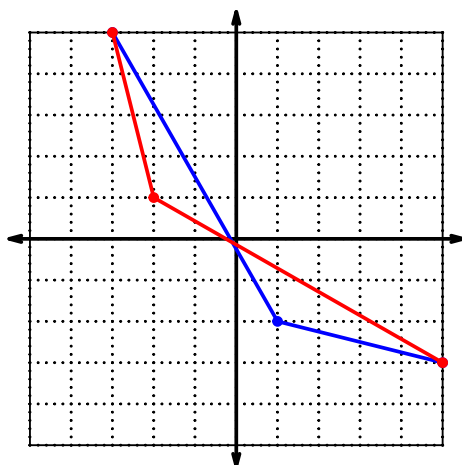
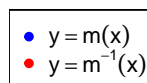
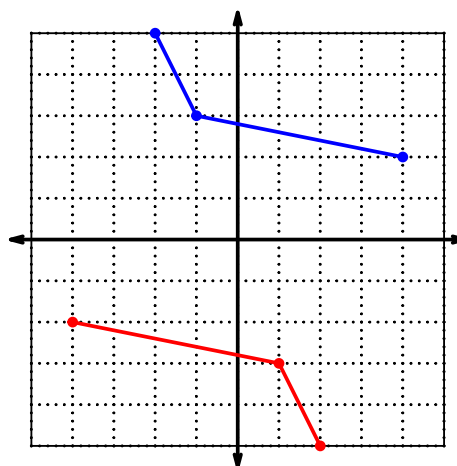
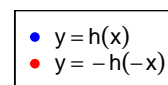
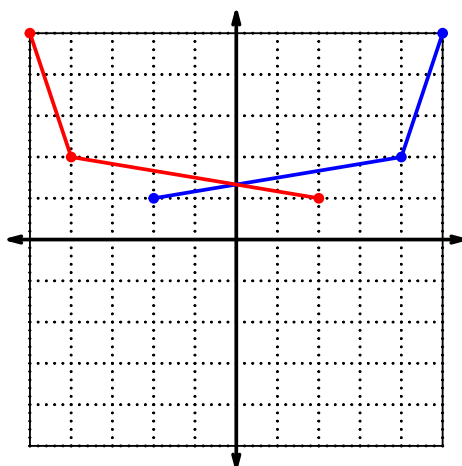
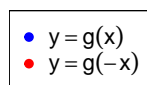
1. Let function f be defined by the polynomial below:

$$f(x) = 6x^4 + 2x^3 - 8x^2 + 3x - 5$$

Draw lines that match each function reflection with its polynomial:

Reflections**Polynomials**

2. In each xy plane shown below, a function is graphed with blue. Draw the indicated reflections (as a second curve, indicated in legend) with black (or with whatever you have). The x axis is horizontal and the y axis is vertical (as typical), and the scale is equal on both axes.



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For all questions on this page, the functions f , g , and h are defined by the table below.

x	$f(x)$	$g(x)$	$h(x)$
1	4	8	2
2	3	7	6
3	7	1	8
4	2	3	4
5	1	4	1
6	6	9	3
7	9	6	5
8	5	2	7
9	8	5	9

3. Evaluate $f(3)$.

$$f(3) = 7$$

4. Evaluate $h^{-1}(6)$.

$$h^{-1}(6) = 2$$

5. By filling more rows of the table, it is possible to make function f **even**. If that were done, what would be the value of $f(-9)$?

If function f is even, then

$$f(-9) = 8$$

6. By filling more rows of the table, it is possible to make function g **odd**. If that were done, what would be the value of $g(-1)$?

If function g is odd, then

$$g(-1) = -8$$

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7. A function, f , is **even** if $f(x) = f(-x)$ for all x in the domain. A function, g , is **odd** if $g(x) = -g(-x)$ for all x in the domain.

Let polynomial p be defined with the following equation:

$$p(x) = x^3 - 1$$

- a. Express $p(-x)$ as a polynomial in standard form.

$$p(-x) = (-x)^3 - 1$$

$$p(-x) = -x^3 - 1$$

- b. Express $-p(-x)$ as a polynomial in standard form.

$$-p(-x) = -(-x^3 - 1)$$

$$-p(-x) = x^3 + 1$$

- c. Is polynomial p even, odd, or neither?

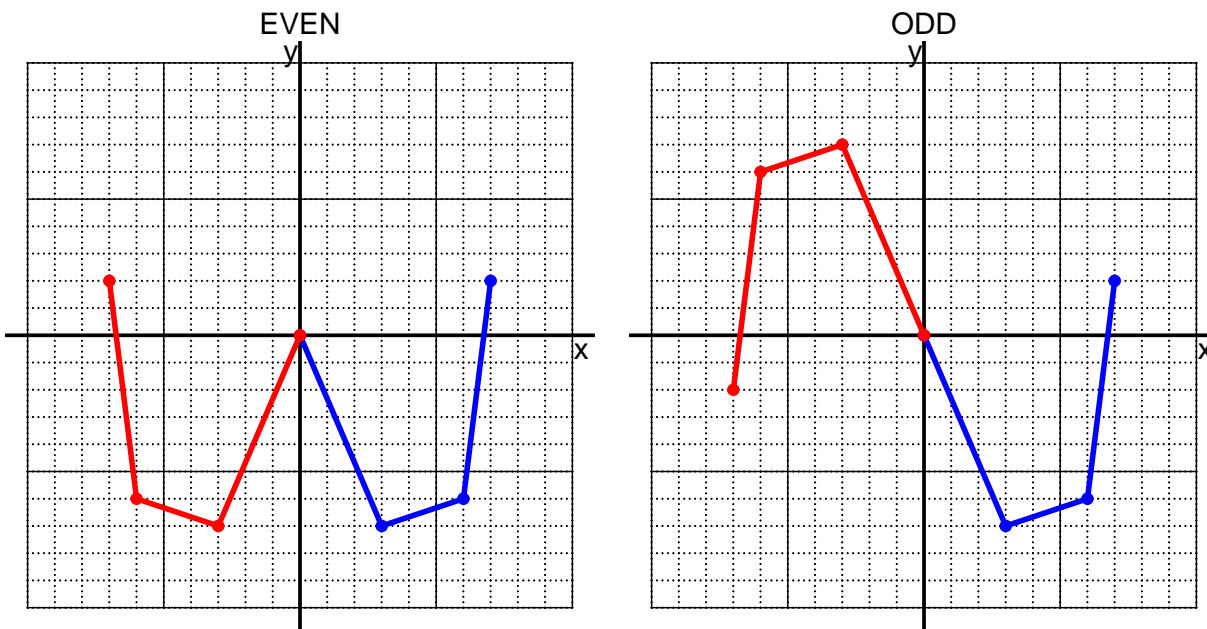
neither

- d. Explain how you know the answer to part c.

We see that $p(x)$ is not equivalent to either $p(-x)$ or $-p(-x)$, so p is neither even nor odd.

Exam: Function Reflections (Solution version 42)

8. I have drawn half of a function. Draw the other half to make it even or odd.



9. Let function f be defined with the equation below.

$$f(x) = \frac{x}{5} - 6$$

- a. Evaluate $f(50)$.

step 1: divide by 5
step 2: subtract 6

$$\begin{aligned} f(50) &= \frac{(50)}{5} - 6 \\ f(50) &= 4 \end{aligned}$$

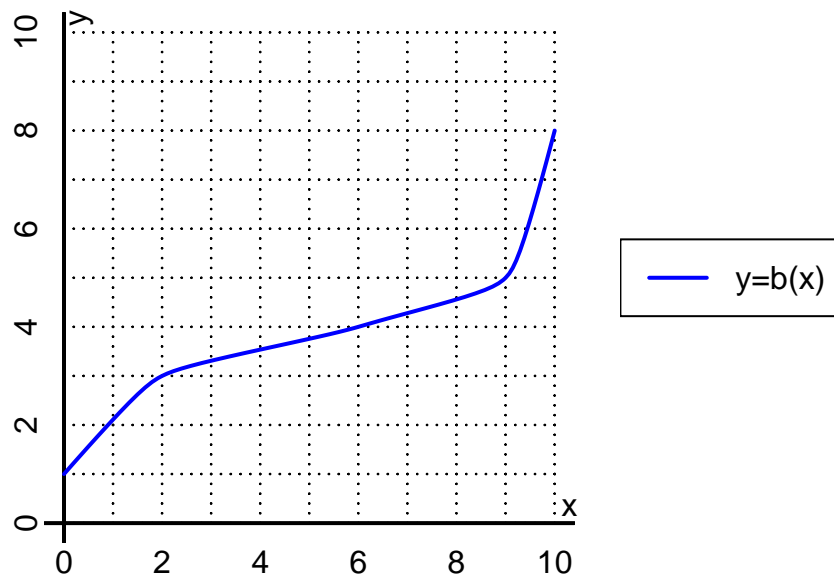
- b. Evaluate $f^{-1}(10)$.

step 1: add 6
step 2: multiply by 5

$$\begin{aligned} f^{-1}(x) &= 5(x + 6) \\ f^{-1}(10) &= 5((10) + 6) \\ f^{-1}(10) &= 80 \end{aligned}$$

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10. The function b is represented by the curve $y = b(x)$ graphed below.



a. Evaluate $b(9)$.

$$b(9) = 5$$

b. Evaluate $b^{-1}(3)$.

$$b^{-1}(3) = 2$$

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11. Function f is defined by the table below.

a. Complete the columns for $-f(x)$ and $f(-x)$ and $-f(-x)$.

x	$f(x)$	$-f(x)$	$f(-x)$	$-f(-x)$
-2	-8	8	-8	8
-1	6	-6	6	-6
0	0	0	0	0
1	6	-6	6	-6
2	-8	8	-8	8

b. Is function f even, odd, or neither?

even

c. How do you know the answer to part b?

Function f is even because column $f(-x)$ matches column $f(x)$ exactly.